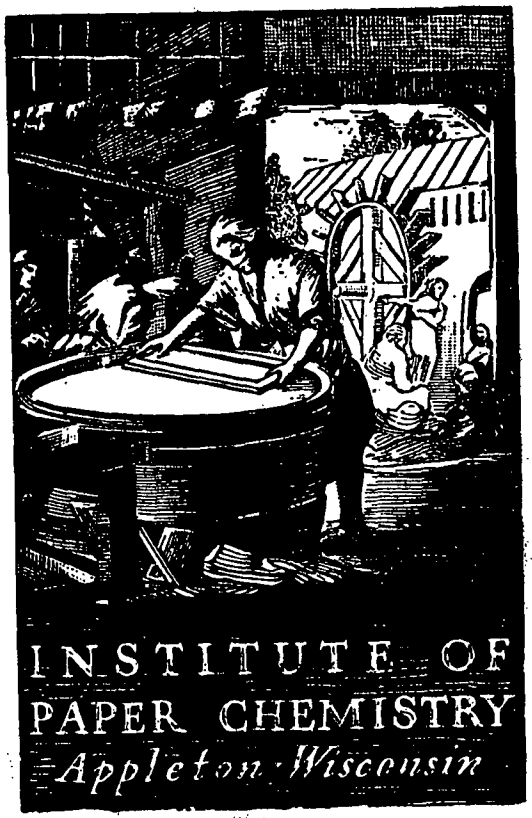

CONTINUOUS BASELINE STUDY

Project 1108-13

Report 171

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

July 1, 1961

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS BASELINE STUDY

Project 1108-13

Report 171

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

July 1, 1961

TABLE OF CONTENTS

	Page
PRESENTATION AND DISCUSSION OF TEST RESULTS	1
SUMMARY OF COMPOSITE MILL AVERAGES	2
NUMBER OF SAMPLE LOTS SUBMITTED BY EACH MILL	3
PERCENTAGE DEVIATIONS FROM 42-LB. BASIS WEIGHT SPECIFICATIONS	4
GRAPHICAL PRESENTATIONS	5
INSTITUTE AND MILL TEST DATA FOR INDIVIDUAL MILLS	9
SUMMARY OF TEST RESULT COMPARISONS	27
COMPARISON OF INSTITUTE-MILL DIFFERENCES BY PERIODS	28
SUMMARY OF AGREEMENT BETWEEN INSTITUTE AND MILL RESULTS	29
PRECONDITIONING AND CONDITIONING DATA FOR THE MILL TESTS	30

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS BASELINE STUDY

PRESENTATION AND DISCUSSION OF TEST RESULTS

During the month of June, one hundred and six sample lots of 42-lb. fourdrinier kraft linerboard representing the production of seventeen mills were evaluated at The Institute of Paper Chemistry. Each sample lot was evaluated for basis weight, caliper, bursting strength, and Elmendorf tearing strength. The average strength results for each mill may be seen in Table I and are graphically presented in Fig. 1 to 5. In addition to a comparison of the current mill averages for the various tests, Table I also shows the current F.K.I. averages, the cumulative F.K.I. averages, and the F.K.I. indexes. For each test, the current mill average represents the average obtained on all sample lots evaluated during the current period, the current F.K.I. average represents the average of the current mill averages, and the cumulative F.K.I. average represents the average of the current F.K.I. averages for the previous twelve months excluding the current period. The F.K.I. index expressed in per cent is the ratio of the current F.K.I. average to the cumulative F.K.I. average.

In Table II, a tabulation of the number of sample lots submitted by each mill is shown.

Supplementary to the basis weight data given in Table I, a tabulation is given in Table III of the amount by which the basis weight average for each mill varies from the 42-lb. specification set forth in Rule 41.

TABLE I

SUMMARY OF COMPOSITE MILL AVERAGES--JUNE 1 THROUGH JUNE 30, 1961

Mill	Basis Weight, lb.	Caliper, points	Bursting Strength, p.s.i. gage	Elmendorf Tear, g./sheet	
				In Machine	Cross Machine
A	43.3	13.0	102	366	401
B	42.4	12.7	105	329	379
C	43.2	12.6	108	304	366
D	43.0	12.1	112	353	360
E	42.6	12.7	109	317	387
F	No samples submitted.				
G	43.3	13.0	110	320	374
H	No samples submitted.				
I	43.5	12.7	105	360	407
J	43.0	13.5	106	343	366
K	43.4	12.1	110	311	356
L	43.1	13.1	106	336	384
M	42.2	12.1	116	291	330
N	43.7	12.6	110	319	385
O	44.3	11.7	108	335	371
P	42.9	11.9	106	355	405
Q	43.0	12.6	111	311	347
S	42.1	13.2	108	316	344
T	43.0	12.9	109	281	326
Current FKI Average:	43.1	12.6	108	326	370
Cumulative FKI Average:	43.4	12.6	111	331	374
FKI Index, %	99.3	100.0	97.3	98.5	98.9

TABLE II

NUMBER OF SAMPLE LOTS SUBMITTED BY EACH MILL

Mill Code	Number
A	6
B	3
C	8
D	4
E	8
F	0
G	8
H	0
I	7
J	6
K	1
L	9
M	7
N	8
O	4
P	7
Q	8
S	8
T	4
Total	106

TABLE III

PERCENTAGE DEVIATION FROM 42-LB. BASIS WEIGHT

SPECIFICATION

Mill Code	Per Cent
A	+3.1
B	+1.0
C	+2.9
D	+2.4
E	+1.4
F	--
G	+3.1
H	--
I	+3.6
J	+2.4
K	+3.3
L	+2.6
M	+0.5
N	+4.0
O	+5.5
P	+2.1
Q	+2.4
S	+0.2
T	+2.4

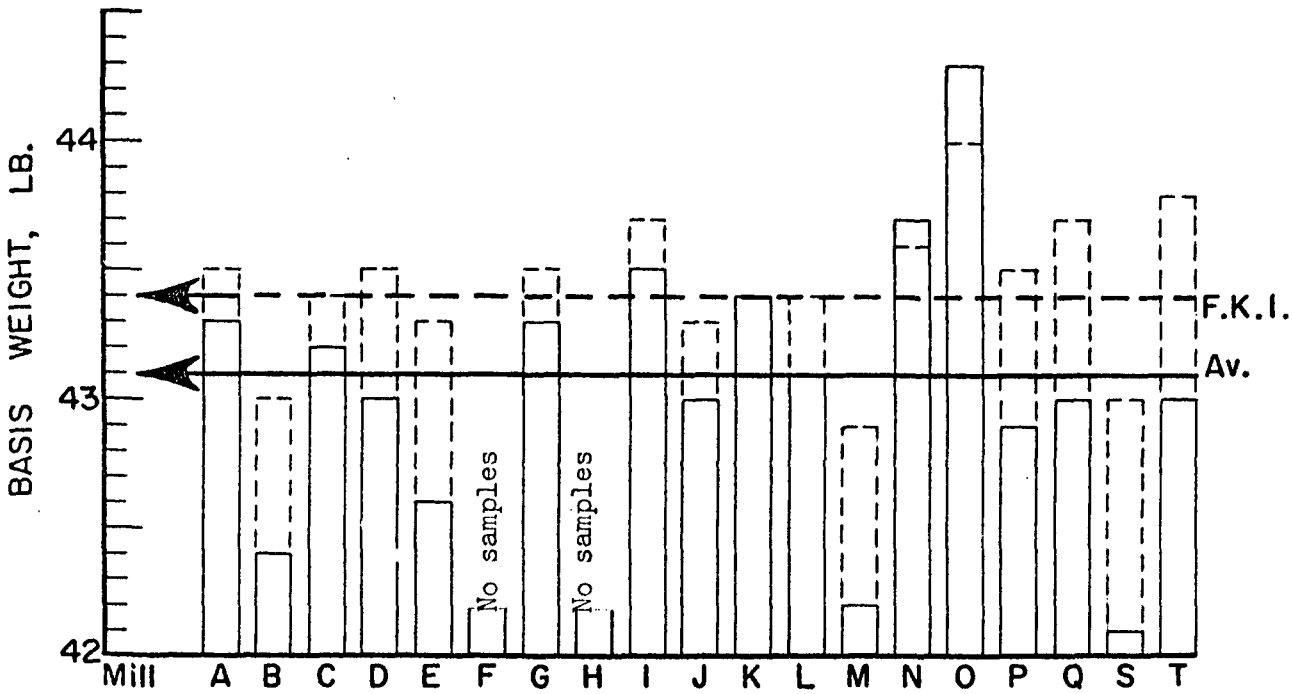

Figure 1. Comparison of Basis weight Results for June, 1961

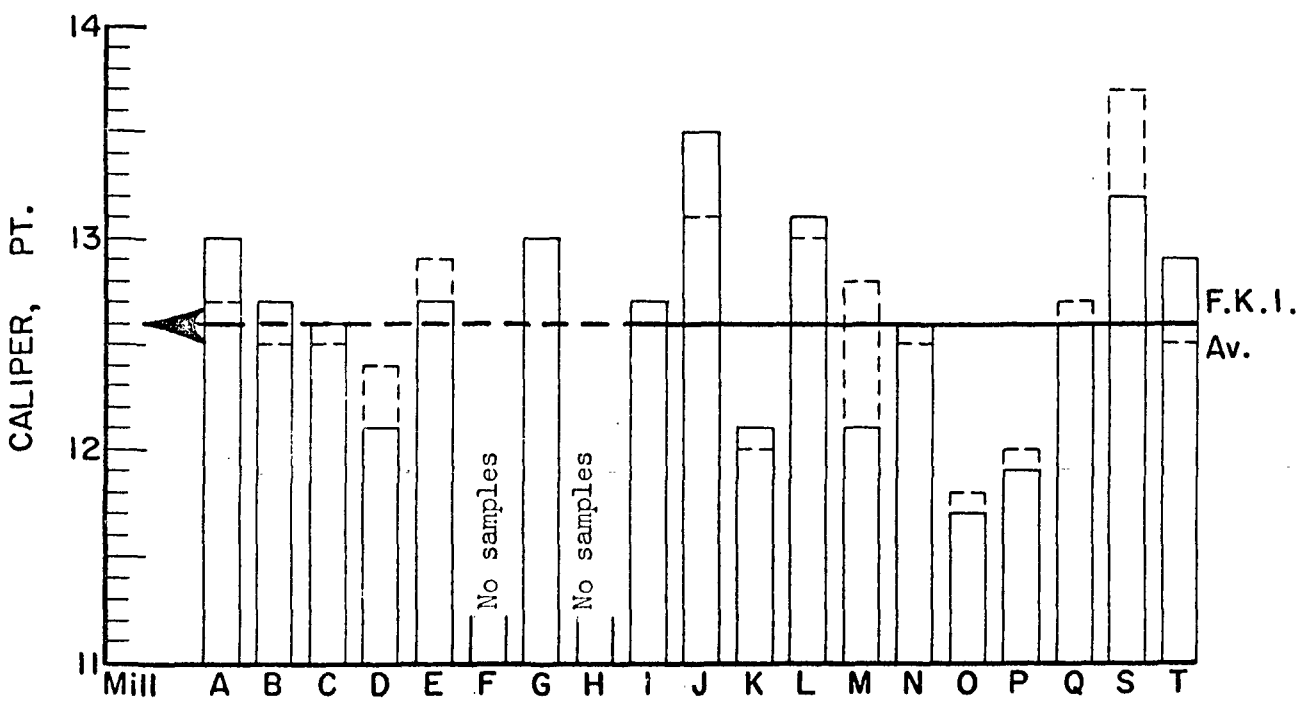

Figure 2. Comparison of Caliper Results for June, 1961

——— Current mill average

– – – – – Cumulative mill average

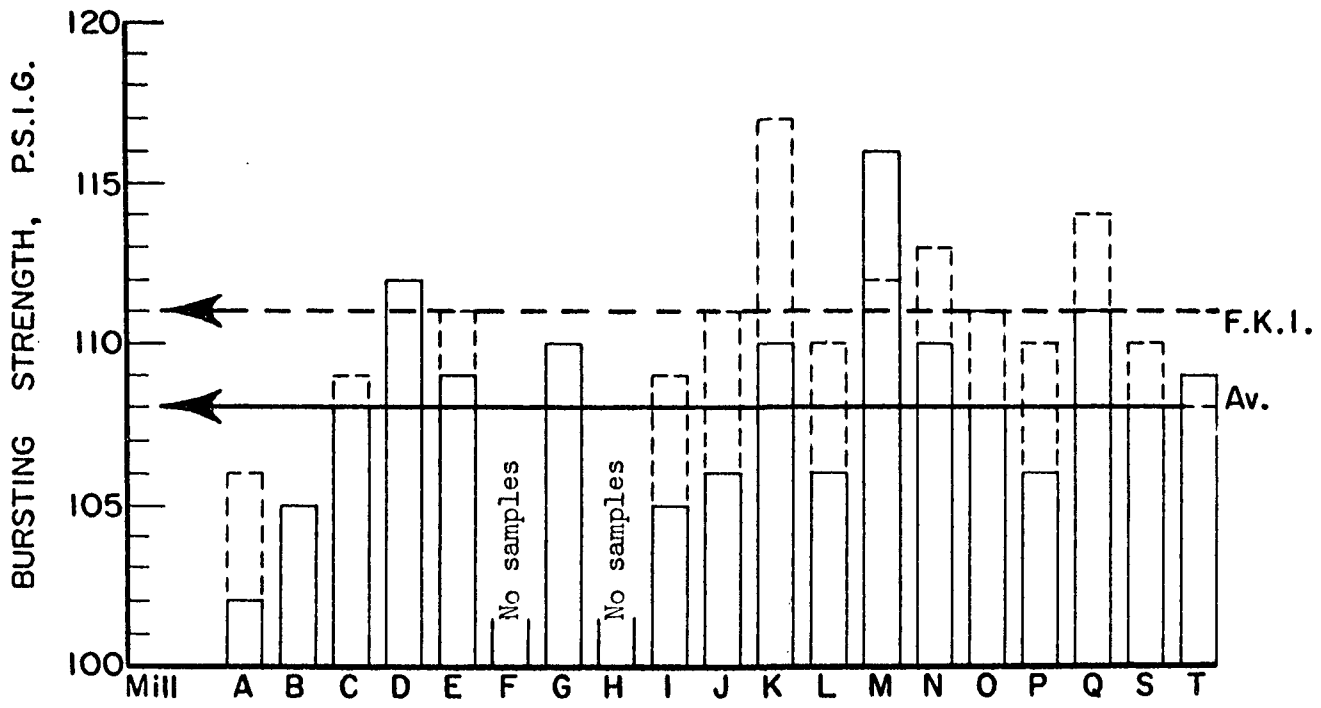

Figure 3. Comparison of Bursting Strength Results for June, 1961

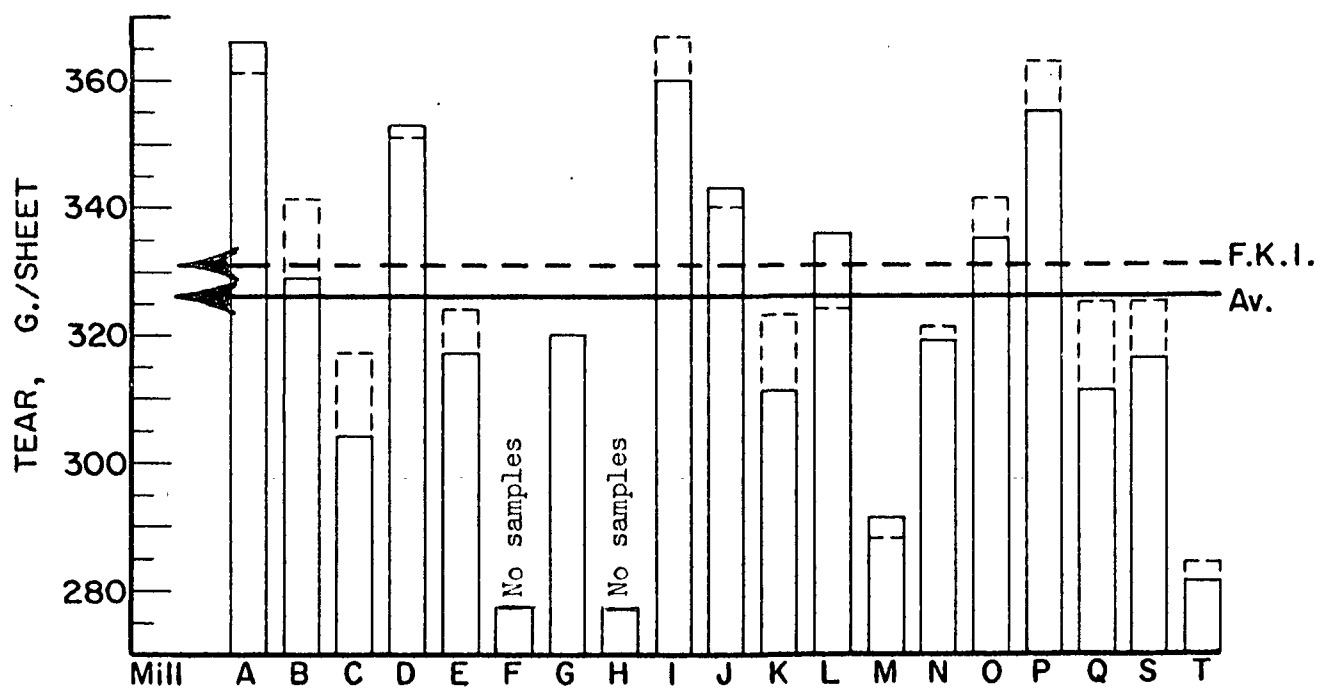

Figure 4. Comparison of Machine-Direction Tear Results for June, 1961

——— Current mill average

- - - - - Cumulative mill average

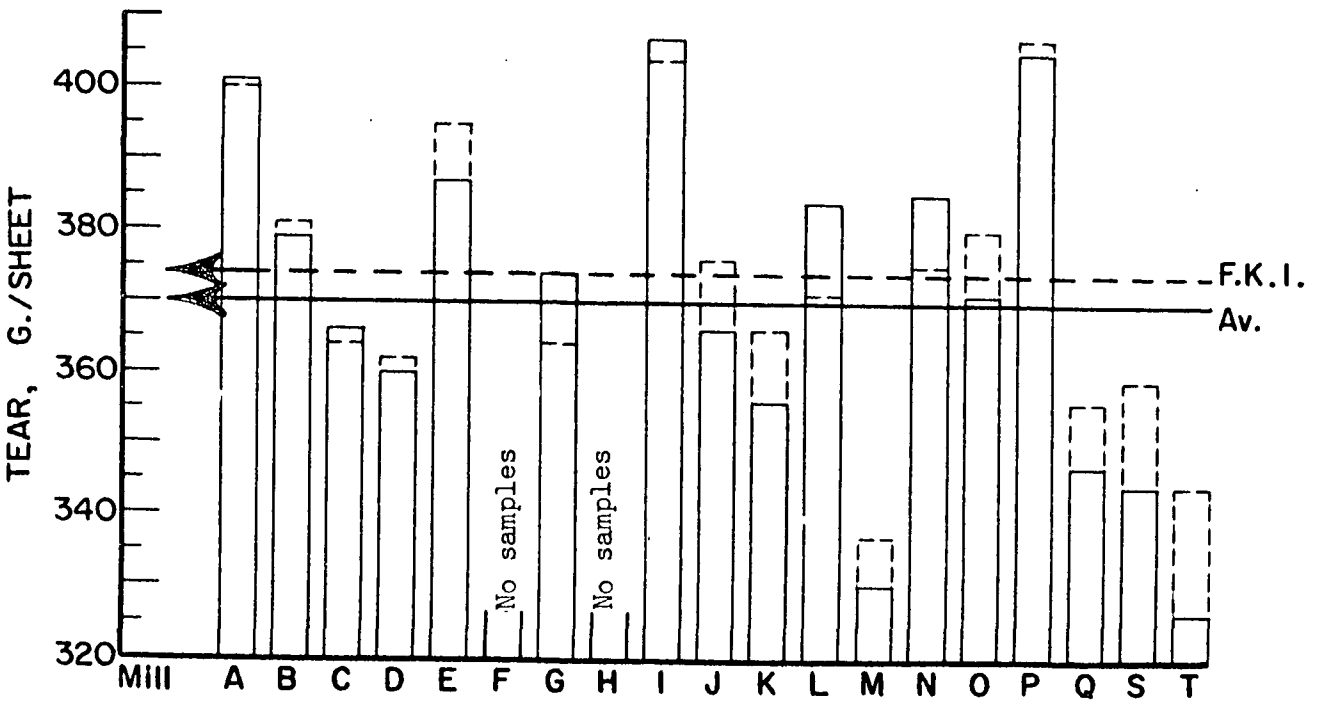

Figure 5. Comparison of Cross-Machine Direction Tear Results for June, 1961

——— Current machine average

- - - - - Cumulative machine average

Shown below from Table I are the maximum and minimum current mill averages for each test and also the current and cumulative F.K.I. averages:

	Current Mill Averages		F.K.I. Averages	
	Max.	Min.	Current	Cumulative
Basis weight, lb.	44.3	42.1	43.1	43.4
Caliper, points	13.5	11.7	12.6	12.6
Bursting strength, p.s.i. gage	116	102	108	111
Machine direction Elmendorf tear, g./sheet	366	281	326	331
Cross-machine direction Elmendorf tear, g./sheet	407	326	370	374

The test results obtained at the Institute and at the mill are given alphabetically in Tables IV to XXII for each mill. Included in each of these tables are the maximum, minimum, and average test data obtained at the Institute on each sample lot of linerboard. The data obtained at the Institute include also for each test the calculation of (1) a current mill average that represents the average of the averages obtained on the individual sample lots of linerboard evaluated during the current period, (2) a cumulative mill average that represents the average of the current mill averages for the previous twelve months excluding the current period, (3) a mill factor expressed in per cent that represents the ratio of the current mill average to the cumulative mill average, and (4) a mill index expressed in per cent that represents the ratio of the current mill average to the cumulative F.K.I. average. As mentioned above, the results presented in Tables IV to XXII also include data obtained at the mills. The mill data

TABLE IV

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL A--42-LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i. gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
5-22-61	WFlS	2	44.2	42.0	43.2	43.0	-0.2	13.2	12.3	12.9	12.2	-0.7	115	82	102	103	+1	392	336	367[a]	--	--	456	368	410[a]	--	--
6- 5-61	WFlS	1	44.0	42.2	42.9	42.5	-0.4	13.2	12.2	12.7	12.0	-0.7	120	85	107	110	+3	384	320	351[a]	--	--	408	344	382[a]	--	--
6- 6-61	WFlS	1	44.0	42.0	43.0	42.8	-0.2	14.0	12.3	13.3	12.4	-0.9	112	77	95	99	+4	400	328	362[a]	--	--	432	344	395[a]	--	--
6- 7-61	WFlS	2	44.0	42.2	42.9	42.8	-0.1	14.0	12.7	13.2	12.2	-1.0	120	76	103	104	+1	400	288	347[a]	--	--	440	360	385[a]	--	--
6- 8-61	WFlS	2	45.0	43.4	44.2	44.0	-0.2	13.8	12.6	13.2	12.6	-0.6	123	85	100	110	+10	464	320	399	--	--	464	360	412[a]	--	--
6-13-61	WFlS	2	44.6	42.6	43.7	43.4	-0.3	13.3	12.2	12.9	12.0	-0.9	123	79	103	110	-7	448	304	372[a]	--	--	464	376	409[a]	--	--
Current Mill Average:					43.3	43.1	-0.2			13.0	12.2	-0.8			102	106	+4			366					401		
Cumulative Mill Average:					43.5					12.7					106					361					400		
Mill Factor, %					99.5					102.4					96.2					101.4					100.2		
Mill Index, %					98.8					103.2					91.9					110.6					107.2		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE V

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL B—42-LB. LINERBOARD

[illegible]	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet—In					Elmendorf Tear, g./sheet—Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
[illegible]	S.F.	7	43.4	41.4	42.4	42.2	-0.2	13.8	12.3	13.1	12.8	-0.3	124	76	102	110	+ 8	408	272	327[a]	309	-18	408	312	367[a]	373	+6
[illegible]	S.F.	7	43.8	42.0	42.8	42.4	-0.4	14.0	12.3	13.2	12.8	-0.4	122	73	96	107	+11	368	320	341[a]	322	-19	424	376	395[a]	372	-23
[illegible]	S.F.	7	43.0	41.4	42.1	42.0	-0.1	12.0	11.3	11.6	11.7	+0.1	138	91	115	120	+ 5	376	272	319	322	+ 3	408	328	375[a]	383	+8
Current Mill Average:					42.4	42.2	-0.2			12.7	12.4	-0.3			105	112	+ 7			329	317	-12			379	376	-3
Cumulative Mill Average:					43.0					12.5					105					341					381		
Mill Factor, %					98.6					101.6					100.0					96.5					99.5		
Mill Index, %					97.7					100.8					94.6					99.4					101.3		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE VI

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL C--42 LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
5-19-61	w.F.	1	44.4	42.0	43.0	43.5	+0.5	13.8	12.4	13.1	12.9	-0.2	118	95	108	107	-1	352	256	295[a]	315	+20	384	320	354[a]	396	+42
5-20-61	w.F.	1	44.2	42.4	43.3	43.2	+0.2	13.7	12.2	12.9	12.8	-0.1	127	90	107	107	0	328	272	302[a]	316	+14	448	360	397[a]	396	- 1
5-27-61	w.F.	1	44.2	42.0	43.2	43.6	+0.4	13.1	12.0	12.9	12.7	-0.2	123	93	103	105	+2	344	256	299	298	- 1	384	304	343[a]	380	+37
5-28-61	w.F.	1	43.8	41.8	42.7	42.9	+0.2	13.0	12.1	12.6	12.5	-0.1	117	94	104	105	+1	320	232	282[a]	290	+ 8	360	312	334[a]	374	+40
6- 1-61	w.F.	1	45.0	44.0	44.3	44.5	+0.2	13.1	12.0	12.6	12.5	-0.1	123	95	113	109	-4	368	280	317	308	- 9	440	328	373[a]	385	+12
6-10-61	w.F.	1	43.2	41.0	42.1	42.7	+0.6	12.3	11.1	11.8	11.8	0.0	130	100	112	111	-1	336	288	307	321	+14	392	336	362[a]	400	+38
6-11-61	w.F.	1	44.0	41.8	43.1	43.5	+0.4	12.8	11.7	12.3	12.3	0.0	131	90	113	112	-1	344	264	307[a]	320	+13	400	352	374[a]	418	+44
6-14-61	w.F.	1	44.6	42.0	43.6	43.8	+0.2	13.2	12.3	12.9	12.8	-0.1	137	85	105	107	+2	368	304	325[a]	315	-10	440	328	387[a]	398	+11
Current Mill Average					43.2	43.5	+0.3			12.6	12.5	-0.1			108	108	0			304	310	+ 6			366	393	+27
Cumulative Mill Average:					43.4					12.5					109					317					364		
Mill Factor, %					99.5					100.8					99.1					95.9					100.5		
Mill Index, %					99.5					100.0					97.3					91.8					97.9		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE VII

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

Mill D--42 LB. LINERBOARD

Furnish	Mach. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i./rage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
		Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
[illegible]	M.F.	--	44.0	42.0	43.0	42.9	-0.1	12.3	11.0	11.7	11.8	+0.1	129	92	112	108	-4	384	296	359[a]	344	-15	416	312	345[a]	356	+11
[illegible]	M.F.	--	44.0	42.0	43.1	43.1	0.0	12.5	11.8	12.1	12.1	0.0	124	70	106	106	0	392	312	358[a]	361	+ 3	424	320	363[a]	378	+15
[illegible]	M.F.	--	43.2	41.8	42.7	42.9	+0.2	12.9	12.0	12.4	12.5	+0.1	131	97	115	108	-7	384	296	337[a]	336	- 1	384	336	351[a]	371	+20
[illegible]	M.F.	--	44.0	42.0	43.2	43.2	0.0	13.0	12.0	12.4	12.5	+0.1	129	104	114	111	-3	440	304	358[a]	335	-23	424	344	383[a]	382	- 1
Current Mill Average:				43.0	43.0	0.0			12.1	12.2	+0.1			112	109	-3			353	344	- 9			360	372	+12
Cumulative Mill Average				43.5					12.4					112					351					362		
Mill Factor, %				98.9					97.6					100.0					100.6					99.4		
Mill Index, %				99.1					96.0					100.9					106.6					96.3		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE VIII

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

Mill E--42 LB. LINERBOARD

Roll No.	Mon. No.	Basis Weight, lb. Institute Max.	Basis Weight, lb. Institute Min.	Basis Weight, lb. Institute Av.	Basis Weight, lb. Mill Av.	Basis Weight, lb. Diff.	Caliper, points Institute Max.	Caliper, points Institute Min.	Caliper, points Institute Av.	Caliper, points Mill Av.	Caliper, points Diff.	Bursting Strength, p.s.i. gage Institute Max.	Bursting Strength, p.s.i. gage Institute Min.	Bursting Strength, p.s.i. gage Institute Av.	Bursting Strength, p.s.i. gage Mill Av.	Bursting Strength, p.s.i. gage Diff.	Elmendorf Tear, g./sheet--In Institute Max.	Elmendorf Tear, g./sheet--In Institute Min.	Elmendorf Tear, g./sheet--In Institute Av.	Elmendorf Tear, g./sheet--In Mill Av.	Elmendorf Tear, g./sheet--In Diff.	Elmendorf Tear, g./sheet--Across Institute Max.	Elmendorf Tear, g./sheet--Across Institute Min.	Elmendorf Tear, g./sheet--Across Institute Av.	Elmendorf Tear, g./sheet--Across Mill Av.	Elmendorf Tear, g./sheet--Across Diff.
[illegible]	#[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	129	92	110	110	0	376	272	326	329	+3	464	320	385[a]	407	+21
[illegible]	#[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	125	91	110	109	-1	388	248	313[a]	329	+16	472	328	397[a]	410	+13
[illegible]	#[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	125	94	107	111	+4	392	280	327[b]	331	+4	480	320	394[a]	409	+15
[illegible]	#[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	123	96	107	108	+1	376	264	310	335	+25	432	328	382[a]	414	+32
[illegible]	#[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	122	87	106	105	-1	336	256	299[b]	344	+45	456	336	377[a]	407	+30
[illegible]	#[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	123	85	109	107	-2	376	288	332	330	-2	408	352	385[a]	416	+31
[illegible]	#[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	127	87	111	106	-5	352	240	302	329	+27	432	328	383[a]	408	+25
[illegible]	#[illegible]	1	43.8	42.2	42.9	42.9	0.0	13.2	12.2	12.8	12.8	0.0	125	92	109	106	-3	376	248	326[a]	336	+10	408	360	389[a]	409	+20
Current Mill Average:			42.6	42.9	+0.3			12.7	12.6	-0.1			109	108	-1			317	334	+17			387	410	+23
Cumulative Mill Average:			43.3					12.9					111					324					395		
Mill Factor, %			98.4					98.4					98.2					97.6					98.0		
Mill Index, %			98.2					100.8					98.2					95.8					103.5		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE IX

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

Mill F--42 LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet---In					Elmendorf tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
No Samples Submitted																										

TABLE X

Mill G--42-LB. LINERBOARD

[illegible]-61	wFlS	2	44.6	43.0	43.8	43.5	-0.3	14.0	13.1	13.6	13.2	-0.4	128	86	108	114	+6	408	280	320[a]	324	+ 4	400	320	363[a]	440	+77
[illegible]-28-61	wFlS	2	43.6	42.2	43.0	42.3	-0.7	13.1	12.3	12.8	12.1	-0.7	130	99	113	124	+11	384	288	339	316	-23	424	344	382[a]	400	+18
-30-61	--	2	43.2	42.0	42.6	42.3	-0.3	13.0	12.0	12.6	12.3	-0.3	132	83	108	111	+3	384	288	332[a]	332	0	432	352	385[a]	390	+ 5
[illegible] 7-61	wFlS	2	44.2	42.0	43.1	42.9	-0.2	14.0	12.7	13.3	13.0	-0.3	124	86	102	102	0	344	272	303[a]	318	+15	416	312	365[a]	397	+32
[illegible] 8-61	wFlS	2	44.6	41.8	43.6	42.6	-1.0	12.8	11.9	12.5	12.2	-0.3	140	87	115	115	0	360	280	316[a]	333	+17	408	328	359[a]	406	+47
[illegible] 9-61	wFlS	2	44.2	42.2	43.2	42.5	-0.7	14.1	13.0	13.5	13.2	-0.3	129	84	108	101	-7	336	248	303[a]	312	+ 9	400	312	371[a]	409	+38
[illegible]-10-61	wFlS	2	44.0	41.6	42.9	43.2	+0.3	13.3	12.0	12.8	12.9	+0.1	130	80	112	109	-3	400	280	328[a]	339	+11	440	336	375[a]	402	+27
[illegible]-13-61	wFlS	2	44.2	43.2	43.9	42.7	-1.2	13.3	12.3	13.0	12.7	-0.3	136	77	114	113	-1	344	280	315[a]	327	+12	448	352	392[a]	437	+45
Current Mill Average:					43.3	42.7	-0.6			13.0	12.7	-0.3			110	111	+1			320	325	+ 5			374	410	+36
Cumulative Mill Average:					43.5					13.0					110					320					364		
Mill Factor, %					99.5					100.0					100.0					100.0					102.7		
Mill Index, %					99.8					103.2					99.1					96.7					100.0		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XI

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

Mill H--42-lb. LINERBOARD

Date Made	Finish	Mch. No.	Basis weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
No samples submitted.																											

TABLE XII

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

Mill I--42-lb. LINERBOARD

5-20-61	W.F.	--	44.2	43.2	43.8	43.2	-0.6	14.0	12.2	12.8	12.4	-0.4	132	77	108	110	+2	400	328	366	377	+11	464	328	408[a]	405	-3
5-21-61	W.F.	--	45.0	42.4	43.6	43.2	-0.4	12.9	11.7	12.4	11.7	-0.7	129	77	106	108	+2	408	312	359[a]	363	+ 4	472	368	401[a]	387	-14
5-21-61	W.F.	--	44.0	42.0	43.1	42.5	-0.6	13.6	11.9	12.9	12.3	-0.6	123	83	100	106	+6	432	280	359[a]	365	+ 6	432	360	400[a]	396	-4
5-26-61	W.F.	--	44.0	42.6	43.6	42.8	-0.8	13.1	12.2	12.8	12.4	-0.4	133	84	106	108	+2	448	328	365[a]	385	+20	488	384	419[a]	400	-19
5-26-61	W.F.	--	44.2	42.0	43.4	43.2	-0.2	13.2	12.2	12.7	12.3	-0.4	131	84	105	110	+5	416	304	343[a]	377	+34	464	368	425[a]	417	-8
6- 4-61	W.F.	--	44.0	42.6	43.6	42.7	-0.9	13.0	12.2	12.6	12.2	-0.4	127	85	108	111	+3	416	320	358[a]	377	+19	432	344	387[a]	431	+44
6- 6-61	W.F.	--	44.0	42.8	43.5	43.7	+0.2	13.2	12.2	12.7	12.3	-0.4	126	79	102	107	+5	416	328	371	405	+34	448	368	409[a]	427	+18
Current Mill Average:					43.5	43.0	-0.5			12.7	12.2	-0.5			105	109	+4			360	379	+19			407	409	+2
Cumulative Mill Average:					43.7					12.7					109					367					404		
Mill Factor, %					99.5					100.0					96.3					98.1					100.7		
Mill Index, %					100.2					100.8					94.6					108.8					108.8		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XIII

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL J--42-LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
5-11-61[b]	wFlS	1	44.4	42.2	43.5	42.9	-0.6	13.9	12.8	13.4	12.8	-0.6	136	92	113	108	-5	400	280	326[a]	307	-19	440	344	389[a]	348	-41
5-11-61	wFlS	1	44.4	42.0	43.4	44.0	+0.6	14.0	12.9	13.4	13.4	0.0	128	90	111	113	+2	360	280	323[a]	363	+40	472	328	369[a]	417	+48
5-[illegible]-61	wFlS	1	43.2	42.6	42.9	42.7	-0.2	14.2	13.2	13.7	13.4	-0.3	130	84	102	104	+2	424	272	344[a]	407	+63	400	328	361[a]	442	+81
5-[illegible]-61	wFlS	1	42.8	42.2	42.6	42.6	0.0	14.2	13.1	13.7	13.3	-0.4	125	84	106	104	-2	384	304	349[a]	409	+60	400	344	361[a]	447	+86
5-[illegible]-61	wFlS	1	43.4	41.8	42.6	42.6	0.0	14.2	13.1	13.7	13.2	-0.5	124	78	104	104	0	400	312	358[a]	381	+23	400	320	361[a]	400	+39
5-15-61	wFlS	1	43.4	42.2	42.8	42.6	-0.2	14.0	12.8	13.5	13.2	-0.3	117	80	100	105	+5	400	304	356[a]	385	+29	384	344	359[a]	406	+47
Current Mill Average:					43.0	42.9	-0.1			13.5	13.2	-0.3			106	106	0			343	375	+32			366	410	+44
Cumulative Mill Average:					43.3					13.1					111					340					376		
Mill Factor, %					99.3					103.1					95.5					100.9					97.3		
Mill Index, %					99.1					107.1					95.5					103.6					97.9		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

[b] This date appeared on the sample received by the Institute. The mill data sheet gives the date of manufacture as May 6, 1961.

TABLE XIV

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL K--42-LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
6-13-61	m.f.	1	44.2	42.4	43.4	43.4	0.0	12.7	11.8	12.1	11.9	-0.2	124	98	110	115	+5	384	272	311[a]	358	+47	408	328	356[a]	389	+33
Current Mill Average:					43.4	43.4	0.0			12.1	11.9	-0.2			110	115	+5			311	358	+47			356	389	+33
Cumulative Mill Average:					43.4					12.0					117					323					366		
Mill Factor, %					100.0					100.8					94.0					96.3					97.3		
Mill Index, %					100.0					96.0					99.1					94.0					95.2		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XV

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL L--42-LB. LINERBOARD

Furnish	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
[illegible]	--	1	43.8	41.6	42.8	42.8	0.0	14.0	12.0	13.0	12.2	-0.8	124	84	106	108	+ 2	384	288	320[a]	296	-24	416	352	382[a]	397	+15
[illegible]	--	1	44.2	41.6	43.3	43.8	+0.5	13.8	12.2	13.0	12.4	-0.6	127	87	106	120	+14	352	256	315[a]	325	+10	448	328	379[a]	396	+17
[illegible]	--	1	42.2	40.8	41.5	41.5	0.0	13.2	11.7	12.5	12.1	-0.4	124	92	106	114	+ 8	392	240	307[a]	276	-31	400	336	365[a]	357	- 8
[illegible]	--	1	44.2	42.6	43.6	43.3	-0.3	13.8	12.2	12.8	12.3	-0.5	125	85	103	108	+ 5	472	312	359[a]	293	-66	408	320	356[a]	363	+ 7
[illegible]	--	1	44.2	42.4	43.5	43.4	-0.1	13.8	12.8	13.2	12.7	-0.5	129	87	108	114	+ 6	448	312	371[a]	304	-67	464	392	422[a]	411	-11
[illegible]	--	1	44.2	42.8	43.4	43.3	-0.1	13.9	12.8	13.4	12.7	-0.7	137	85	110	111	+ 1	408	248	319	293	-26	472	352	400[a]	392	- 8
[illegible]	--	1	43.8	42.2	43.2	43.2	0.0	13.8	12.8	13.4	12.8	-0.6	135	83	107	107	0	384	264	337	295	-42	408	344	377[a]	375	- 2
[illegible]	--	1	44.0	42.6	43.3	43.2	-0.1	13.9	12.7	13.3	12.8	-0.5	123	80	102	105	+ 3	416	328	374[a]	380	+ 6	440	344	392[a]	411	+19
[illegible]	--	1	44.2	43.2	43.7	43.6	-0.1	13.9	12.5	13.1	12.5	-0.6	126	81	103	110	+ 7	376	272	323[a]	288	-35	432	336	387[a]	404	+17
Current Mill Average:					43.1	43.1	0.0			13.1	12.5	-0.6			106	111	+ 5			336	305	-31			384	389	+ 5
Cumulative Mill Average:					43.4					13.0					110					324					371		
Mill Number, %					99.3					100.8					96.4					103.7					103.5		
Mill Index, %					99.3					104.0					95.5					101.5					102.7		

[a] Mill average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XVI

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL M--42-LB. LINERBOARD

Test Mark	Finish	Mch. No.	Basis weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
[illegible]	w.f.	1	43.0	41.6	42.5	42.0	-0.5	12.3	11.8	12.0	12.0	0.0	132	100	117	112	-5	328	248	286	250	-36	336	296	316[a]	340	+24
[illegible]	w.f.	1	42.6	41.4	42.0	41.8	-0.2	12.5	11.8	12.1	12.0	-0.1	130	97	111	112	+1	312	216	273[a]	253	-20	352	280	323[a]	334	+11
[illegible]	w.f.	1	42.8	41.0	41.9	42.2	+0.3	12.3	11.6	12.0	12.1	+0.1	137	100	117	115	-2	336	216	275[a]	255	-20	384	272	315[a]	344	+29
[illegible]	w.f.	1	43.2	41.8	42.4	42.0	-0.4	12.7	11.9	12.1	12.0	-0.1	145	89	116	111	-5	360	272	298[a]	251	-47	352	304	335[a]	339	+ 4
[illegible]	w.f.	1	43.0	41.8	42.2	42.0	-0.2	12.3	11.7	12.1	12.0	-0.1	132	97	117	112	-5	360	256	300[a]	252	-48	368	312	339[a]	340	+ 1
[illegible]	w.f.	1	42.8	42.0	42.3	41.8	-0.5	13.0	12.0	12.4	12.1	-0.3	133	94	112	112	0	328	248	284	256	-28	352	312	334[a]	332	- 2
[illegible]	w.f.	1	42.8	41.6	42.2	42.0	-0.2	12.7	11.9	12.2	12.0	-0.2	142	94	119	112	-7	360	272	321[a]	255	-66	384	320	345[a]	339	- 6
Current Mill Average:					42.2	42.0	-0.2			12.1	12.0	-0.1			116	112	-4			291	253	-38			330	338	+ 8
Cumulative Mill Average:					42.9					12.8					112					288					337		
Mill Factor, %					98.1					94.5					103.6					101.0					97.9		
Mill Index, %					97.2					96.0					104.5					87.9					88.2		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XVII

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL N--42-LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
-8-61	w.F.	2	44.0	43.0	43.5	42.8	-0.7	12.7	12.0	12.3	12.1	-0.2	123	95	108	109	+1	344	248	289[a]	295	+ 6	384	328	353[a]	385	+32
-8-61	w.F.	2	44.0	42.4	43.3	42.8	-0.5	12.8	11.8	12.2	12.1	-0.1	118	95	106	110	+4	344	232	281[a]	300	+19	384	304	355[a]	371	+16
-8-61	w.F.	2	43.8	42.6	43.2	42.8	-0.4	12.8	12.0	12.3	12.0	-0.3	127	84	109	109	0	328	248	294	294	0	392	328	363[a]	360	- 3
-13-61	w.F.	2	44.0	43.0	43.5	42.8	-0.7	13.3	12.5	12.9	12.4	-0.5	142	92	114	115	+1	424	320	351	342	- 9	472	352	415[a]	411	- 4
-13-61	w.F.	2	44.0	43.2	43.7	43.0	-0.7	13.3	12.6	12.9	12.4	-0.5	128	87	111	114	+3	416	272	355	336	-19	448	392	419[a]	413	- 6
-14-61	w.F.	2	45.0	43.4	44.2	44.0	-0.2	13.3	12.2	12.8	12.7	-0.1	132	90	111	113	+2	352	264	321[a]	344	+23	416	360	387[a]	424	+37
-14-61	w.F.	2	45.0	43.8	44.2	44.0	-0.2	13.1	12.3	12.8	12.7	-0.1	135	85	112	113	+1	360	280	333[a]	344	+11	432	344	393[a]	427	+34
-14-61	w.F.	2	45.0	43.6	44.2	43.9	-0.3	13.2	12.1	12.8	12.7	-0.1	129	97	112	112	0	384	296	326	338	+12	416	368	393[a]	437	+44
Current Mill Average:					43.7	43.2	-0.5			12.6	12.4	-0.2			110	112	+2			319	324	+ 5			385	403	+18
Cumulative Mill Average:					43.6					12.5					113					321					375		
Mill Factor, %					100.2					100.8					97.3					99.4					102.7		
Mill Index, %					100.7					100.0					99.1					96.4					102.9		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XVIII

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL O--42-LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb. Institute Max.	Institute Min.	Institute Av.	Mill Av.	Diff.	Caliper, points Institute Max.	Institute Min.	Institute Av.	Mill Av.	Diff.	Bursting Strength, p.s.i.gage Institute Max.	Institute Min.	Institute Av.	Mill Av.	Diff.	Elmendorf Tear, g./sheet, In Institute Max.	Institute Min.	Institute Av.	Mill Av.	Diff.	Elmendorf Tear, g./sheet, Across Institute Max.	Institute Min.	Institute Av.	Mill Av.	Diff.
[illegible]	W.F.	3	45.0	44.0	44.4	45.0	+0.6	11.9	11.0	11.3	11.0	-0.3	126	90	108	111	+3	360	230	321[a]	343	+27	392	336	357[a]	418	+61
8-23-61	W.F.	3	45.0	43.8	44.3	44.7	+0.4	11.6	11.1	11.3	11.1	-0.2	135	94	116	113	-3	400	296	345[a]	330	-15	416	336	366[a]	379	+13
8-28-61	W.F.	2	45.8	44.2	44.9	44.6	-0.3	12.8	11.5	12.0	11.6	-0.4	122	91	108	107	-1	394	304	333	353	+20	400	360	388[a]	397	+ 9
9- 1-61	W.F.	3	44.0	43.2	43.6	43.9	+0.3	12.5	11.8	12.1	11.7	-0.4	122	71	101	106	+5	368	320	343	329	-14	416	328	374[a]	386	+12
Current Mill Average:					44.3	44.5	+0.2			11.7	11.3	-0.4			108	109	+1			335	340	+ 5			371	395	+24
Cumulative Mill Average:					44.0					11.8					111					341					380		
Mill Factor, %:					100.7					99.2					97.3					98.2					97.6		
Mill Index, %					102.1					92.9					97.3					101.2					99.2		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XIX

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL P--42-LB. LINERBOARD

Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
		Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
[illegible]	M.B.	---	43.6	42.4	43.1	42.9	-0.2	12.8	12.1	12.0	11.9	-0.1	131	90	112	119	+7	440	336	383[a]	400	+17	472	376	441[a]	440	-1
[illegible]	M.B.	---	43.8	41.8	42.4	41.7	-0.7	11.9	10.5	11.4	11.2	-0.2	123	100	110	115	+5	400	328	349[a]	324	-25	464	360	401[a]	388	-13
[illegible]	M.B.	---	43.8	42.0	42.7	42.2	-0.5	12.8	11.5	12.1	11.7	-0.4	113	92	102	107	+5	368	280	335[a]	344	+ 9	416	352	385[a]	401	+16
[illegible]	M.B.	---	43.0	42.0	42.4	42.2	-0.2	12.0	11.0	11.5	11.2	-0.3	121	88	104	108	+4	400	296	346[a]	360	+14	416	368	393[a]	441	+48
[illegible]	M. B.	--	44.2	42.2	43.3	43.1	-0.2	12.3	11.4	12.0	11.8	-0.2	121	89	105	106	+1	416	312	357[a]	364	+ 7	448	360	405[a]	420	+15
[illegible]	M.B.	--	44.0	42.2	43.0	42.4	-0.6	12.6	11.5	11.9	11.7	-0.2	128	89	105	112	+7	392	320	359	360	+ 1	456	368	408[a]	435	+27
[illegible]	---	---	44.2	42.2	43.4	43.6	+0.2	13.0	11.3	12.1	11.8	-0.3	145	83	107	107	0	400	296	356	371	+15	440	352	405[a]	428	+23
Current Mill Average:				42.9	42.6	-0.3			11.9	11.6	-0.3			106	110	+4			355	360	+ 5			405	422	+17
Cumulative Mill Average:				43.5					12.0					110					363					407		
Mill Factor, %				98.6					99.2					96.4					97.8					99.5		
Mill Index, %				98.8					94.4					95.5					107.3					108.3		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XX

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL Q--42-LB. LINERBOARD

[illegible]	[illegible]	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
[illegible]	m.F.	--	43.6	41.8	42.4	42.5	+0.1	12.5	11.9	12.2	12.2	0.0	136	89	115	116	+ 1	368	280	309[a]	273	-36	384	312	335[a]	337	+2
[illegible]	m.F.	--	41.4	40.6	41.0	41.1	+0.1	13.0	12.2	12.7	12.4	-0.3	123	87	107	108	+ 1	312	248	281[a]	275	- 6	352	304	328[a]	297	-31
[illegible]	m.F.	--	44.0	43.4	43.8	43.4	-0.4	13.2	12.4	12.8	12.4	-0.4	129	99	114	120	+ 6	440	304	343[a]	280	-63	392	320	365[a]	345	-20
[illegible]	m.F.	--	43.8	42.4	43.0	43.0	0.0	12.7	12.0	12.3	12.0	-0.3	124	92	108	114	+ 6	376	272	319[a]	284	-35	384	312	347[a]	331	-16
[illegible]	m.F.	--	44.0	42.4	43.1	42.8	-0.3	13.3	12.2	12.7	12.3	-0.4	131	96	114	117	+ 3	400	288	317[a]	292	-25	392	320	351[a]	329	-22
[illegible]	m.F.	--	43.8	42.8	43.2	43.2	0.0	12.8	12.0	12.3	12.0	-0.3	133	95	114	122	+ 8	392	256	307[a]	260	-47	352	312	333[a]	325	- 8
[illegible]	m.F.	--	43.8	42.0	43.1	42.9	-0.2	13.0	12.2	12.6	12.1	-0.5	126	83	104	115	+11	344	264	300[a]	307	+ 7	416	312	365[a]	343	-22
[illegible]	m.F.	--	45.0	43.6	44.2	43.8	-0.4	13.3	12.4	12.9	12.2	-0.7	135	87	114	123	+ 9	344	280	315[a]	285	-30	392	312	350[a]	331	-19
Current Mill Average:					43.0	42.9	-0.1			12.6	12.2	-0.4			111	117	+ 6			311	282	-29			347	330	-17
Cumulative Mill Average:					43.7					12.7					114					325					356		
Mill Factor, %					98.4					99.2					97.4					95.7					97.5		
Mill Index, %					99.1					100.0					100.0					94.0					92.8		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

TABLE XXI

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

MILL S--42-LB. LINERBOARD

Machine	Num. Tests	Basis Weight, lb.					Caliper, mils					Bursting Strength, p.s.i.gage					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
		Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
#F13	2	42.4	41.8	42.1	42.3	+0.2	14.0	12.1	13.1	13.5	-0.4	132	89	115	113	-2	320	248	298[a]	308	+10	376	304	347[a]	387	+40
#F13	2	42.6	40.0	41.4	41.5	+0.1	14.0	13.1	13.5	13.2	-0.3	128	76	106	115	+9	360	256	289[a]	324	+35	384	312	339[a]	372	+33
#F13	2	43.0	41.8	42.8	42.8	+0.1	14.1	13.2	13.7	13.5	-0.2	129	89	109	115	+6	360	272	311[a]	330	+19	368	320	345[a]	385	+40
#F13	2	42.0	40.9	41.5	42.2	+0.7	13.3	12.9	13.0	12.6	-0.4	119	86	103	109	+6	384	280	330[a]	340	+10	384	296	322[a]	380	+58
#F13	2	44.2	42.2	43.2	43.0	-0.2	14.0	12.9	13.5	13.0	-0.5	127	93	108	116	+8	360	264	316[a]	310	- 6	400	320	352[a]	390	+38
#F13	2	44.2	42.0	42.8	43.3	+0.5	14.1	12.8	13.3	13.5	+0.2	144	84	116	120	+4	368	248	310[a]	296	-14	384	296	341[a]	390	+49
#F13	2	43.2	42.0	42.9	42.7	+0.8	13.9	12.8	13.2	13.2	0.0	133	91	110	120	+10	392	280	329[a]	315	-14	408	344	375[a]	425	+50
#F13	2	42.8	42.1	42.9	42.3	+0.4	13.1	11.9	12.5	12.3	-1.0	128	78	100	104	+4	384	296	346[a]	339	- 7	344	320	329[a]	456	+127
Mill Average:				42.1	42.4	+0.3			13.2	13.0	-0.2			108	114	+ 6			316	320	+ 4			344	398	+54
Two Mill Average:				43.0					13.7					110					325					359		
Per, %				97.9					96.4					98.2					97.2					95.8		
Max, %				97.0					101.5					97.3					95.5					92.0		

[a] Average includes the readings for one or more specimens which were beyond the 3/8-inch limit.

All "current mill average" data are calculated from the totals of the individual readings.

TABLE XXII

SUMMARY OF INSTITUTE AND MILL DATA
June, 1961

Mill T--42-LB. LINERBOARD

Date Made	Finish	Mch. No.	Basis Weight, lb.					Caliper, points					Bursting Strength, p.s.i./page					Elmendorf Tear, g./sheet--In					Elmendorf Tear, g./sheet--Across				
			Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill		Institute			Mill	
			Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.	Max.	Min.	Av.	Av.	Diff.
5-26-61	W.F.	1	43.8	42.4	43.1	43.4	+0.3	13.1	12.0	12.6	12.2	-0.4	133	76	107	110	+3	320	248	278[a]	286	+ 8	344	288	322[a]	361	+39
5- 8-61	W.F.	1	44.0	42.0	42.9	43.2	+0.3	13.2	12.0	12.6	12.2	-0.4	125	92	106	110	+4	312	224	271[a]	283	+12	352	288	314[a]	356	+42
5-13-61	W.F.	1	44.0	42.0	43.1	43.4	+0.3	13.5	11.9	12.5	12.1	-0.4	138	86	113	111	-2	328	240	278[a]	284	+ 6	352	272	321[a]	361	+40
5-20-61	W.F.	1	44.4	41.6	42.9	42.5	-0.4	14.3	13.2	13.7	13.0	-0.7	125	82	110	109	-1	320	256	298	287	-11	376	320	347[a]	356	+ 9
Current Mill Average:					43.0	43.1	+0.1			12.9	12.4	-0.5			109	110	+1			281	235	+ 4			326	358	+32
Cumulative Mill Average:					43.8					12.5					108					284					344		
Mill Factor, %:					98.2					103.2					100.9					98.9					94.8		
Mill Index, %:					99.1					102.4					98.2					84.9					87.2		

[a] This average includes the readings for one or more specimens which tore beyond the 3/8-inch limit.

Note: All "current mill average" data are calculated from the totals of the individual readings.

include for each test (1) the average result obtained on each sample lot of linerboard and (2) a current mill average (calculated at the Institute) that represents the average of the averages obtained on the individual sample lots of linerboard evaluated at the mills during the current period. In addition to the presentations of Institute and mill data described above, Tables IV through XXII also include under each test heading a column labeled "Diff." This column shows the differences between averages obtained at the Institute and those obtained at the mills. The data obtained at the Institute are used as the reference in calculating these differences.

The average test results obtained at the Institute and at the mills are summarized in Table XXIII. Shown in Table XXIII for each mill is the difference for each test between the current mill average based on Institute data and the current mill average based on mill data. In addition, for each test the maximum difference encountered in comparing Institute and mill averages for individual sample lots is shown. In Table XXIV, the difference for each test between current mill average based on Institute data and that based on mill data has been converted to per cent (based on Institute data as a reference). Corresponding data for the two preceding periods are shown.

A summary of the agreement obtained in the comparisons of Institute and mill test data for the current period is shown in Table XXV. This summary is based on the results given in Table XXIV. The tabulated data show the number of mills, and the percentage of all mills which this number represents, whose average test results for the current period fall within designated percentages from the average test results obtained at the Institute. It may

TABLE XXIII

SUMMARY OF TEST RESULT COMPARISONS (Average Mill and Institute Results)

Mills[a]	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	S	T
No. of Samples Compared	6	3	8	4	8	0	8	0	7	6	1	9	7	8	4	7	8	8	4
Basis Weight																			
Institute	43.3	42.4	43.2	43.0	42.6	--	43.3	--	43.5	43.0	43.4	43.1	42.2	43.7	44.3	42.9	43.0	42.1	43.0
Mill	43.1	42.2	43.5	43.0	42.9	--	42.7	--	43.0	42.9	43.4	43.1	42.0	43.2	44.5	42.6	42.9	42.4	43.1
Av. Diff.[b]	-0.2	-0.2	+0.3	0.0	+0.3	--	-0.6	--	-0.5	-0.1	0.0	0.0	-0.2	-0.5	+0.2	-0.3	-0.1	+0.3	+0.1
Max. Diff.[c]	-0.4	-0.4	+0.6	+0.2	+0.7	--	-1.2	--	-0.9	±0.6	0.0	+0.5	-0.5	-0.7	+0.6	-0.7	-0.4	+0.9	-0.4
Caliper																			
Institute	13.0	12.7	12.6	12.1	12.7	--	13.0	--	12.7	13.5	12.1	13.1	12.1	12.6	11.7	11.9	12.6	13.2	12.9
Mill	12.2	12.4	12.5	12.2	12.6	--	12.7	--	12.2	13.2	11.9	12.5	12.0	12.4	11.3	11.6	12.2	13.0	12.4
Av. Diff.[b]	-0.8	-0.3	-0.1	+0.1	-0.1	--	-0.3	--	-0.5	-0.3	-0.2	-0.6	-0.1	-0.2	-0.4	-0.3	-0.4	-0.2	-0.5
Max. Diff.[c]	-1.0	-0.4	-0.2	+0.1	-0.4	--	-0.7	--	-0.7	-0.6	-0.2	-0.8	-0.3	-0.5	-0.4	-0.4	-0.7	-1.0	-0.7
Bursting Strength																			
Institute	102	105	108	112	109	--	110	--	105	106	110	106	116	110	108	106	111	108	109
Mill	106	112	108	109	108	--	111	--	109	106	115	111	112	112	109	110	117	114	110
Av. Diff.[b]	+4	+7	0	-3	-1	--	+1	--	+4	0	+5	+5	-4	+2	+1	+4	+6	+6	+1
Max. Diff.[c]	+10	+11	-4	-7	-5	--	+11	--	+6	±5	+5	+14	-7	+4	+5	+7	+11	+10	+4
Tearing Strength, in																			
Institute	366	329	304	353	317	--	320	--	360	343	311	336	291	319	335	355	311	316	281
Mill	--	317	310	344	334	--	325	--	379	375	358	305	253	324	340	360	282	320	285
Av. Diff.[b]	--	-12	+6	-9	+17	--	+5	--	+19	+32	+47	-31	-38	+5	+5	+5	-29	+4	+4
Max. Diff.[c]	--	-19	+20	-23	+45	--	-23	--	+34	+63	+47	-67	-66	+23	+27	-25	-63	+35	+12
Tearing Strength, across																			
Institute	401	379	366	360	387	--	374	--	407	366	356	384	330	385	371	405	347	344	326
Mill	--	376	393	372	410	--	410	--	409	410	389	389	338	403	395	422	330	398	358
Av. Diff.[b]	--	-3	+27	+12	+23	--	+36	--	+2	+44	+33	+5	+8	+18	+24	+17	-17	+54	+32
Max. Diff.[c]	--	-23	+44	+20	+32	--	+77	--	+44	+86	+33	+19	+29	+44	+61	+48	-31	+127	+42

[a] Comparison based on averages involved only those samples on which mill test data were submitted.

[b] Average difference is the difference between the Institute mill average and the mill average based on mill test data.

[c] Maximum difference encountered in comparing the Institute average and the mill averages for any sample submitted by that particular mill.

TABLE XXIV

COMPARISON OF INSTITUTE-MILL DIFFERENCES BY PERIODS
Average Difference, Per Cent

Mill	Period	Basis Weight	Caliper	Bursting Strength	Tear, in	Tear, across
A	Current	-0.5	-.6	+4	---	---
	170th	+0.2	-.5	+3	---	---
	169th	-0.2	-5	+5	---	---
B	Current	-0.5	-.2	+7	-4	-0.8
	170th	+1	-2	+2	-4	+0.3
	169th	+0.2	-2	+6	-7	+0.3
C	Current	+0.7	-0.8	0	+2	+7
	170th	+0.7	-0.8	-2	+6	+8
	169th	+0.5	0	+2	+6	+10
D	Current	0	+0.8	-3	-3	+3
	170th	+0.9	+2	-0.9	-2	0
	169th	+0.5	0	-4	-6	+0.3
E	Current	+0.7	-0.8	-0.9	+5	+6
	170th	+0.7	0	0	+0.9	+5
	169th	+0.5	-2	-3	+0.8	+2
F	Current	---	---	---	---	---
	170th	---	---	---	---	---
	169th	---	---	---	---	---
G	Current	-1	-2	+0.9	+2	+10
	170th	-0.7	-4	+2	+6	+11
	169th	-0.2	-2	-0.9	-2	+6
H	Current	---	---	---	---	---
	170th	---	---	---	---	---
	169th	---	---	---	---	---
I	Current	-1	-4	+4	+5	+0.5
	170th	-1	-4	+0.9	+2	-0.5
	169th	0	-3	0	+4	+0.3
J	Current	-0.2	-2	0	+9	+12
	170th	0	-2	+2	+2	+5
	169th	+0.7	-2	-5	-6	-0.3
K	Current	0	-2	+5	+15	+9
	170th	+0.2	-0.8	+0.9	+ 3	+0.8
	169th	+1	-2	+2	+22	+2
L	Current	0	-5	+5	- 9	+1
	170th	0	-2	-2	- 6	+1
	169th	0	-2	+2	-11	-0.8
M	Current	-0.5	-0.8	-3	-13	+2
	170th	-0.5	-3	0	-12	+0.9
	169th	-1	-2	0	-12	+5
N	Current	-1	-2	+2	+ 2	+5
	170th	0	-2	-0.9	-14	+0.8
	169th	-0.7	-4	-5	-12	-6
O	Current	+0.5	-3	+0.9	+ 1	+6
	170th	+0.9	-3	+3	- 2	+4
	169th	+1	-2	+3	- 4	+2
P	Current	-0.7	-3	+4	+ 1	+4
	170th	-0.7	-2	+2	- 4	+2
	169th	-0.9	-2	+4	- 6	+1
Q	Current	-0.2	-3	+5	- 9	-5
	170th	-0.5	-2	+0.9	-12	-7
	169th	+0.9	-0.8	+3	- 7	-3
S	Current	+0.7	-2	+6	+ 1	+16
	170th	+0.2	-1	+6	+ 0.6	+10
	169th	+1	-2	+6	- 0.9	+9
T	Current	+0.2	-4	+0.9	+ 1	+10
	170th	+0.5	-5	+3	+ 3	+6
	169th	+0.5	-2	+0.9	- 0.4	+5

TABLE XXV

SUMMARY OF AGREEMENT BETWEEN INSTITUTE AND MILL RESULTS

	Average Percentage Difference Between Institute and Mill Test Results								
	±0.5	±1	±2	±3	±4	±5	±7.5	±10	±16
Basis weight									
Number of mills	10	17							
Percentage of all mills	58.8	100.0							
Caliper									
Number of mills	0	4	10	13	15	16	17		
Percentage of all mills	0.0	23.5	58.8	76.5	88.2	94.1	100.0		
Bursting strength									
Number of mills	2	6	7	9	12	15	17		
Percentage of all mills	11.8	35.3	41.2	52.9	70.6	88.2	100.0		
Tearing strength, in									
Number of mills	0	4	7	8	9	11	11	14	16
Percentage of all mills	0.0	25.0	43.8	50.0	56.2	68.8	68.8	87.5	100.0
Tearing strength, across									
Number of mills	1	3	4	5	6	8	11	14	16
Percentage of all mills	6.2	18.8	25.0	31.2	37.5	50.0	68.8	87.5	100.0

be noted from this summary that agreement between the results obtained at the Institute and those obtained at the mills was generally very good.

Preconditioning and conditioning data pertinent to the tests results obtained at the mills are given in Table XXVI.

TABLE XXVI

PRECONDITIONING AND CONDITIONING DATA FOR MILL TESTS

	Preconditioning			Conditioning		
Mill Code	Relative Humidity, %	Temperature, °F.	Time, hr.	Relative Humidity, %	Temperature, °F.	Time, hr.
A		none		50	73	24
B	50	73	24	50	73	--
C	50	73	24	50	73	24
D		none		50	73	24
E		none		55-58	72-73	--
F	No samples submitted.					
G	50	72	120	50	70-72	120-144
H	No samples submitted.					
I	52-54	72-73	48	50	73	--
J	50	70	24	62	74	--
K		none		50	73	24
L	50	70	48	50	70	3
M		none		50-60	74-85	--
N	50	73	24	50	73	24
O		none		50	73	24
P		none		45-58	69-72	48
Q	34-35	77-78	8	48-52	72-73	16
S	50	72	24		none	
T	42-48	71-78	0.5	50	73	24

THE INSTITUTE OF PAPER CHEMISTRY

W. N. Hubert, Research Aide
Container Section

R. C. McKee, Chief, Container Section